## **APPENDIX F**

## Water Quality

Salmonids are dependent on abundant, clean, cool water for their survival. Several water quality components are important to or regulate salmonid habitat and resources: water temperature, dissolved oxygen, pH, total suspended solids (TSS), and specific toxic materials. The quality, delivery and transport of sediments throughout stream channels, lakes, and marine areas play a significant role in salmonid survival and production. Water quality may be altered through point source (i.e., an effluent pipe) or non-point source (i.e., stormwater run off). For the purpose of this report, water quality information is:

information collected on water quality parameters such as dissolved oxygen, temperature, and turbidity.

The Washington Department of Ecology (DOE) monitors waterbodies in the state of Washington for compliance with the Clean Water Act. A substantial amount of information exists for water quality. This information is maintained by federal, state, tribal, and local governments as well as non-governmental organizations. It was not feasible to compile all this information within the project period. However, a number of the water quality databases are identified in the Database Directory.

APPENDIX F Water Quality Impairs				
WRIA	Parameter	Frequency		
0	Total Dissolved Gas	1		
1	Ammonia-N	2		
	Dissolved Oxygen	15		
	Dissolved oxygen	1		
	Fine Sediment	6		
	Temperature	6		
3	Dissolved Oxygen	3		
	Nutrients	3		
5	Dissolved Oxygen	1		
	Dissolved oxygen	1		
	Temperature	3		
	Nutrients	4		
7	Ammonia-N	2		
	Dissolved Oxygen	6		
	Temperature	8		
	pН	1		
	Nutrients	5		
	Turbidity	1		
8	Dissolved Oxygen	5		
	Nutrients	8		
9	Ammonia-N	1		
	Dissolved Oxygen	3		
	Temperature	3		
	Exotic Aquatic Plants	1		
10	Nutrients	2		
10	Ammonia-N	1		
	Dissolved Oxygen	1		
	Instream Flow	2		
11	Temperature	5		
11	Nutrients  Dissolved Overson	1		
1,2	Dissolved Oxygen	1		
	Dissolved Oxygen Nutrients	1		
13	Dissolved Oxygen	4		
13	Temperature	2		
	Nutrients	3		
14	pH	2		
15	Temperature	1		
13	pH	2		
	Nutrients	1		
16	Instream Flow	1		
17	Fish Habitat	3		
- '	Temperature	1		
18	Instream Flow	2		
	Temperature	1		
	Tomporature	1 11		

ments wh	nents which may Affect Salmonids by WRIA					
	WRIA	Parameter	Frequency			
	19	Fine Sediment	1			
		Temperature	5			
	20	Dissolved Oxygen	3			
l l		Temperature	25			
l l	21	Dissolved Oxygen	1			
] [		Temperature	3			
] [	22	Temperature	5			
		Nutrients	1			
	23	Dissolved Oxygen	1			
		рН	1			
		Nutrients	1			
] [	24	Dissolved Oxygen	2			
		Temperature	5			
		рН	1			
	25	Dissolved Oxygen	1			
		Temperature	4			
		Nutrients	1			
] [	26	Dissolved Oxygen	2			
] [		Temperature	10			
		Nutrients	1			
	27	Temperature	4			
	28	Chlorine	1			
		Dissolved Oxygen	7			
	29	Temperature	4			
	30	Instream Flow	6			
		Temperature	3			
	32	Chlorine	1			
		Chloronated Hydrocarbons	1			
		Instream Flow	3			
		Temperature	1			
	33	Dissolved Oxygen	1			
	34	Ammonia-N	4			
		Chlorine	1			
		Dissolved Oxygen	3			
		Temperature	1			
		Ammonia-N	1			
		Nutrients	1			
[	35	Pesticides	1			
<u> </u>		Temperature	3			
[	36	Dissolved Oxygen	3			
<u> </u>		Temperature	1			
] [						

APPENDIX F Water Quality Impairments which may Affect Salmonids by WRIA

Dissolved Oxygen         3           Instream Flow         1           Pesticides         2           Temperature         1           38 Instream Flow         1           Temperature         15           39 Ammonia-N         1           Dissolved Oxygen         2           Instream Flow         5           Pesticides         3           Temperature         28           pH         1           41 Dissolved Oxygen         5	APPENDIX F Water Quality Impairments w					
Dissolved Oxygen	WRIA	Parameter	Frequency			
Instream Flow	37	Ammonia-N	2			
Pesticides         2           Temperature         1           38 Instream Flow         1           Temperature         15           39 Ammonia-N         1           Dissolved Oxygen         2           Instream Flow         5           Pesticides         3           Temperature         28           pH         1           41 Dissolved Oxygen         5           Temperature         6           42 Dissolved Oxygen         1           43         45           45 Dissolved Oxygen         4           Instream Flow         3           Temperature         5           46 Instream Flow         1           47 Dissolved Oxygen         1           48 Instream Flow         9           Temperature         1           49 Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52 pH         1           53 Ammonia-N         1           54 Ammonia-N         1           Temperature         1           55 Dissolved Oxygen         2           Temperature         <		Dissolved Oxygen	3			
Temperature         1           38         Instream Flow         1           Temperature         15           39         Ammonia-N         1           Dissolved Oxygen         2           Instream Flow         5           Pesticides         3           Temperature         28           pH         1           41         Dissolved Oxygen         5           Temperature         6           42         Dissolved Oxygen         1           43         1         4           45         Dissolved Oxygen         4           Instream Flow         1         1           46         Instream Flow         1           47         Dissolved Oxygen         1           Metals         2         2           pH         1         1           48         Instream Flow         9           Temperature         1         1           49         Dissolved Oxygen         3           Instream Flow         1         1           Temperature         1         1           52         pH         1           53		Instream Flow	1			
Temperature         1           38         Instream Flow         1           Temperature         15           39         Ammonia-N         1           Dissolved Oxygen         2           Instream Flow         5           Pesticides         3           Temperature         28           pH         1           41         Dissolved Oxygen         5           Temperature         6           42         Dissolved Oxygen         1           43         1         4           45         Dissolved Oxygen         4           Instream Flow         1         1           46         Instream Flow         1           47         Dissolved Oxygen         1           Metals         2         2           pH         1         1           48         Instream Flow         9           Temperature         1         1           49         Dissolved Oxygen         3           Instream Flow         1         1           Temperature         1         1           52         pH         1           53		Pesticides	2			
Temperature         15           39         Ammonia-N         1           Dissolved Oxygen         2           Instream Flow         5           Pesticides         3           Temperature         28           pH         1           41         Dissolved Oxygen         5           Temperature         6           42         Dissolved Oxygen         1           43         1         4           45         Dissolved Oxygen         4           Instream Flow         3         1           Temperature         5         4           46         Instream Flow         1           47         Dissolved Oxygen         1           48         Instream Flow         9           Temperature         1           49         Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           55         Dissolved Oxygen         2           Temperature         1		Temperature	1			
39         Ammonia-N         1           Dissolved Oxygen         2           Instream Flow         5           Pesticides         3           Temperature         28           pH         1           41         Dissolved Oxygen         5           Temperature         6           42         Dissolved Oxygen         1           43         1         4           45         Dissolved Oxygen         4           Instream Flow         1         1           46         Instream Flow         1           47         Dissolved Oxygen         1           Metals         2         2           pH         1         1           48         Instream Flow         9           Temperature         1         1           49         Dissolved Oxygen         3           Instream Flow         1         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           55         Dissolved Oxygen         2           Temperature         1	38	Instream Flow	1			
Dissolved Oxygen   2		Temperature	15			
Instream Flow	39	Ammonia-N	1			
Pesticides         3           Temperature         28           pH         1           41         Dissolved Oxygen         5           Temperature         6           42         Dissolved Oxygen         1           43         45         Dissolved Oxygen         4           Instream Flow         3         1           Temperature         5         46         Instream Flow         1           47         Dissolved Oxygen         1         1           48         Instream Flow         9         9           Temperature         1         1           49         Dissolved Oxygen         3           Instream Flow         1         1           Temperature         1         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1		Dissolved Oxygen	2			
Pesticides         3           Temperature         28           pH         1           41         Dissolved Oxygen         5           Temperature         6           42         Dissolved Oxygen         1           43         45         Dissolved Oxygen         4           Instream Flow         3         1           Temperature         5         46         Instream Flow         1           47         Dissolved Oxygen         1         1           48         Instream Flow         9         9           Temperature         1         1           49         Dissolved Oxygen         3           Instream Flow         1         1           Temperature         1         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           7         Temperature         1           55         Dissolved Oxygen         2           Temperature         1		Instream Flow	5			
pH         1           41         Dissolved Oxygen         5           Temperature         6           42         Dissolved Oxygen         1           43         45         Dissolved Oxygen         4           Instream Flow         3         Temperature         5           46         Instream Flow         1           47         Dissolved Oxygen         1           Metals         2         2           pH         1         1           48         Instream Flow         9           Temperature         1         3           Instream Flow         1         1           Temperature         1         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           7         Temperature         1           55         Dissolved Oxygen         2           Temperature         1		Pesticides	3			
41         Dissolved Oxygen         5           Temperature         6           42         Dissolved Oxygen         1           43         45         Dissolved Oxygen         4           Instream Flow         3         5           46         Instream Flow         1           47         Dissolved Oxygen         1           Metals         2           pH         1           48         Instream Flow         9           Temperature         1           49         Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           7         Temperature         1           55         Dissolved Oxygen         2           Temperature         1		Temperature	28			
Temperature         6           42         Dissolved Oxygen         1           43         45         Dissolved Oxygen         4           Instream Flow         3         Temperature         5           46         Instream Flow         1           47         Dissolved Oxygen         1           Metals         2           pH         1           48         Instream Flow         9           Temperature         1           49         Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1		рН	1			
42       Dissolved Oxygen       1         43       45       Dissolved Oxygen       4         Instream Flow       3         Temperature       5         46       Instream Flow       1         47       Dissolved Oxygen       1         Metals       2         pH       1         48       Instream Flow       9         Temperature       1         49       Dissolved Oxygen       3         Instream Flow       1         Temperature       1         52       pH       1         53       Ammonia-N       1         54       Ammonia-N       1         Temperature       1         55       Dissolved Oxygen       2         Temperature       1	41	Dissolved Oxygen	5			
43 45 Dissolved Oxygen 4 Instream Flow 3 Temperature 5 46 Instream Flow 1 47 Dissolved Oxygen 1 Metals 2 pH 1 48 Instream Flow 9 Temperature 1 49 Dissolved Oxygen 3 Instream Flow 1 Temperature 1 52 pH 1 53 Ammonia-N 1 Temperature 1 55 Dissolved Oxygen 2 Temperature 1		Temperature	6			
45         Dissolved Oxygen         4           Instream Flow         3           Temperature         5           46         Instream Flow         1           47         Dissolved Oxygen         1           Metals         2           pH         1           48         Instream Flow         9           Temperature         1           49         Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1	42	Dissolved Oxygen	1			
Instream Flow   3     Temperature   5     46	43					
Temperature         5           46         Instream Flow         1           47         Dissolved Oxygen         1           Metals         2           pH         1           48         Instream Flow         9           Temperature         1           49         Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1	45	Dissolved Oxygen	4			
46       Instream Flow       1         47       Dissolved Oxygen       1         Metals       2         pH       1         48       Instream Flow       9         Temperature       1         49       Dissolved Oxygen       3         Instream Flow       1         Temperature       1         52       pH       1         53       Ammonia-N       1         54       Ammonia-N       1         Temperature       1         55       Dissolved Oxygen       2         Temperature       1		Instream Flow	3			
47       Dissolved Oxygen       1         Metals       2         pH       1         48       Instream Flow       9         Temperature       1         49       Dissolved Oxygen       3         Instream Flow       1         Temperature       1         52       pH       1         53       Ammonia-N       1         54       Ammonia-N       1         Temperature       1         55       Dissolved Oxygen       2         Temperature       1		Temperature	5			
Metals         2           pH         1           48         Instream Flow         9           Temperature         1           49         Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1	46	Instream Flow	1			
pH         1           48         Instream Flow         9           Temperature         1           49         Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1	47	Dissolved Oxygen	1			
48       Instream Flow       9         Temperature       1         49       Dissolved Oxygen       3         Instream Flow       1         Temperature       1         52       pH       1         53       Ammonia-N       1         54       Ammonia-N       1         Temperature       1         55       Dissolved Oxygen       2         Temperature       1		Metals	2			
Temperature         1           49         Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1		рН	1			
49         Dissolved Oxygen         3           Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1	48	Instream Flow	9			
Instream Flow         1           Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1		Temperature	1			
Temperature         1           52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1	49	Dissolved Oxygen	3			
52         pH         1           53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1		Instream Flow	1			
53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1		Temperature	1			
53         Ammonia-N         1           54         Ammonia-N         1           Temperature         1           55         Dissolved Oxygen         2           Temperature         1	52	рН	1			
Temperature 1 55 Dissolved Oxygen 2 Temperature 1		Ammonia-N	1			
55 Dissolved Oxygen 2 Temperature 1	54	Ammonia-N	1			
Temperature 1		Temperature	1			
Temperature 1	55		2			
1						
	56	Dissolved Oxygen	1			
57 Nutrients 1	57		1			

Affect Saimonius by WRIA			
WRIA	Parameter	Frequency	
58	Temperature	2	
59	Ammonia -N	1	
	Dissolved Oxygen	4	
	Nutrients	1	
60	Dissolved Oxygen	4	
	рН	4	
61	Dissolved Oxygen	2	
	Temperature	1	
	рН	2	
62	Dissolved Oxygen	1	
	Pesticides	1	
	Temperature	2	
	рН	2	